The Mars Pathfinder ASI/MET Investigation

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On July 4th 1997, the Mars Pathfinder spacecraft will enter the martian atmosphere, land in the Ares Vallis region, and obtain the first in-situ measurements of the atmosphere and surface since the Viking mission more than 20 years ago. In addition to a Stereo Imager and an Alpha Proton X-Ray spectrometer, the Pathfinder Lander will carry an Atmospheric Structure and Meteorology (ASI/MET) experiment designed to study the atmosphere during the entry, descent, and landed phases of the mission.

The ASI/MET package consists of 3 accelerometers, 4 thermocouple temperature sensors, a Tavis pressure sensor, and a 6-sector hot-wire wind sensor. The sensitivity limits of these instruments are respectively 2 micro g, 0.01 K, 0.25 micro bars, and 0.04 K. Measurements of deceleration in 3-orthogonal axes during entry will be used to determine a density, pressure, temperature profile for the upper atmosphere from 15-150 km, and direct measurements of temperature and pressure in the lower atmosphere will be made as the lander descends on its parachute. After landing, surface pressure measurements will continue and a meteorological mast will deploy. From this mast, atmospheric temperature will be measured 0.25, 0.5, & 1.0 m above the surface, and wind speed and direction will be determined at 1.1 m. Landed data will be acquired continuously for 1 year.

Pathfinder is expected to make a significant contribution to Mars atmospheric science. It will provide a third in-situ atmospheric profile at a different season and local time to the earlier Viking profiles, and its surface observations will generate a climate record at the landing site with an order of magnitude better resolution than Viking. Because measurements will be made at different altitudes, they will also allow superior characterization of the martian surface boundary layer.

Abstract submitted for 1996 DPS meeting

Date submitted: LPI electronic form version 5/96

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Special instructions: Tue Aug 27 15:31:46 CDT 1996

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